

Digitalization of an Integrated “Social and Health” Care Path

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Abstract: The integrated care pathway, designed by the Italian regulatory framework, for individuals who are non-self-sufficient or have serious disabilities, is crucial not only to address healthcare needs but also to meet social needs. It provides access to social and healthcare services through single points of access (PUA) and multidisciplinary integrated teams working at PUAs to define the integrated individual care plan (PAI). This pathway must be organized through close collaboration between healthcare organizations and local social services, requiring integration of services, human resources, as well as the digitalization of processes and interoperability between IT systems. The introduction of a shared computerized platform, configurable and interoperable, enables the creation of a unified socio-health record, facilitating a truly integrated and digitalized care journey where the patient is at the center of attention.

1 INTRODUCTION

The use of a platform for a unified electronic health record across hospital, local, and social healthcare pathways (even beyond the healthcare organization) enables the sharing of information, process integration and monitoring of effectiveness and efficiency throughout most of the life-long care paths of the citizens of the Reggio Emilia province.

The approach adopted in the Reggio Emilia Local Health Authority, in line with regional and national strategy and regulations, extends the well-established experience developed in the hospital network beyond the traditional adoption of Electronic Medical Record systems. The resulting digital ecosystem ensures a comprehensive, patient-centered perspective that follows care paths beyond the acute-care hospital encounters extending towards population and chronicity management and even the management of collateral, yet critical social needs of our citizens.

The adoption of a single comprehensive solution also allows for better management of privacy issues (regulated by the European GDPR) by means of a structural dynamic segmentation of the personal datasets.

2 CONTEXT

Social and health assistance aims to contribute to the creation of an integrated system of social, socio-health, and health services, which together form the welfare of the community at local, regional, and national levels. In Italy, healthcare management is entrusted to healthcare organizations, while the social component falls under the responsibility of municipal Social Services.

Effective integration and collaboration between various stakeholders are essential for the proper functioning of the system. This process is facilitated by the establishment of Single Access Points (PUAs), which enable individuals in conditions of non-self-sufficiency to access social and health services through a single entry point. Multidisciplinary teams, composed of adequately trained professionals, operate within PUAs to address the health needs of individuals comprehensively. These teams employ organizational models that integrate social services, guiding and attending to citizens' needs.

The functions of Single Access Points include reception, information, orientation, assessment, support, and monitoring. They serve as the primary point of reference for assessing and providing care to

people with complex needs who require coordinated health and social interventions.

2.1 Demographic Context

In the socio-demographic context of Reggio Emilia, there is a significant elderly population (see Table 1), alongside vulnerable groups such as those with disabilities and those experiencing social marginalization. This demographic landscape underscores the growing need for an integrated approach to address these issues, with particular attention to future challenges.

Age Interval	Resident population	Unmarried or widowed
<18	84.898	-
18-65	330.664	45%
66-90	107.641	32%
over 90	5.674	83%
Total	528.877	

Figure 1: Demographic situation of the province of Reggio Emilia (2024)

2.2 The Local Health Authority

The Local Health Authority of Reggio Emilia is one of the first Italian entities born from the merger of a Territorial Health organization and a large Hospital, in 2017. Consistently at the forefront of digital healthcare, it has attained Level 6 HIMSS accreditation, one of the highest international standards, shared by only six other Healthcare Authorities in Italy and fourteen across Europe.

The current Authority covers five peripheral hospital facilities and the Arcispedale Santa Maria Nuova Hospital of Reggio Emilia, all integrated into a complex territorial network that includes Hospices, Health Houses, Women's Health Centers, Outpatient Clinics, Mental Health Centers, and other services. It serves a population of about 530,000 inhabitants, 21% of whom are over 65 years old, with a birth rate of 9 births per thousand inhabitants.

The organization consists of about 7,900 employees, 81% of whom work in the healthcare sector, and 19% in other fields. The merger of the two organizations allowed for the sharing of innovative solutions, especially in the hospital field, which were adapted and applied to territorial processes. This approach enabled the organization to be one of the first in Italy to adopt computerized systems for managing out-of-hospital pathways, such as Population Screening, Home Care, and Integrated Pathways, starting in the early 2000s.

3 THE PLATFORM

The Local Health Authority of Reggio Emilia, driven by the need to evolve in contexts beyond traditional hospital departments, identified the need to adopt a platform that was:

- Highly configurable and adaptable to various pathways and settings
- Built with cutting-edge technologies, ensuring adequate performance
- Fully integrated with the province, regional and national Digital Health Ecosystem
- Designed according to the "Privacy by Design" paradigm

This project was not just about acquiring a system, but creating and adopting a complete set of digital solutions and services to support the organization's digitalization.

The experience stems from the initial goal of a full digital management of the hospital clinical pathway: the Matilde platform was born from this need.

The resilience and adaptability of the system allowed for replicating established best practices in the hospital environment, applying them flexibly and effectively to territorial contexts, which by their nature are less standardized. The project gradually extended its scope, aiming at complete management of the patient's clinical pathway, including extra-hospital settings, territorial pathways, and socio-healthcare pathways.

The platform is based on a cloud-based environment provided by the Regional public Healthcare dedicated cloud infrastructure. This guarantees proper management and scale-up capabilities typical of cloud solutions, together with a geographically redundant Disaster-Recovery architecture. National regulations also allow for mission-critical organizations like the Reggio Emilia Hospital Network to keep a “break the glass” local infrastructure that can back-up the cloud solution in case of major connection issues. This local emergency environment guarantees the availability of currently active care paths and main functionalities and integrations.

Matilde platform is fully integrated with the province, regional and national healthcare digital ecosystem, specifically:

- Master Patient Index, linked to the National Health MPI (ANA: Anagrafe Nazionale Assistenti)
- Patient management systems (PMS), which handle all patient encounters (hospital admissions, transfers, discharges) and

territorial care processes (home care, chronic care pathways, etc.)

- Clinical Data Repository, which gather and distributes in standardized formats (e.g. HL7 CDA2) the totality of documents and datasets generated by the over 200 information systems connected
- PACS/VNA, which manages the province enterprise imaging framework
- Order Entry ESB, a general middleware adopted for the reception dispatching and updating of computerized orders of all types (e.g. lab requests, transports, meals, activation of social services)
- Administration Datawarehousing used to collect all the production data used for billing and controller functions

Privacy is guaranteed by a sophisticated, yet centralized and harmonic management of access permissions to single datasets and records. It is possible to configure access to specific parts of information of a person's record to groups of users (Roles). Over 200 user Roles have been identified to manage a capillary distribution of access permissions.

The platform allows for the dynamic modulation of these permissions based on the care path and processes affecting the person's life, thus allowing for the proper extension of access privileges upon the change of setting, responsibilities and clinical status of the person.

The resulting robust, configurable and fully integrated Matilde platforms, allows to create records, pathways, and manage all patient data, as

well as access all data coming from integrated systems.

All activities necessary for the implementation and configuration of the platform are carried out by organizational internal team within the organization, allowing for a fast and vendor-independent management of both operations and system activation/scale-up. The industry vendors proving the solution are only involved in major functional or architectural upgrades.

The overall strategy of extension and development of the Matilde platform in managed by a multidisciplinary team officially appointed by the Local Health Authority Board that includes doctors, healthcare and social professionals, pharmacists, risk management and privacy experts.

The system, in its main modules, is available as an open source solution, according to Italian regulations for software systems developed within public organization (<https://developers.italia.it/it/software/auslre-ausl-reggioemilia-matilde.html>)

4 METHODOLOGY AND IMPLEMENTATION

In 2024, the Unified Access Points (PUA) were introduced at the Local Health Authority of Reggio Emilia, leveraging both healthcare and social operators from the organization itself and the territorial social services managed by the local municipalities.

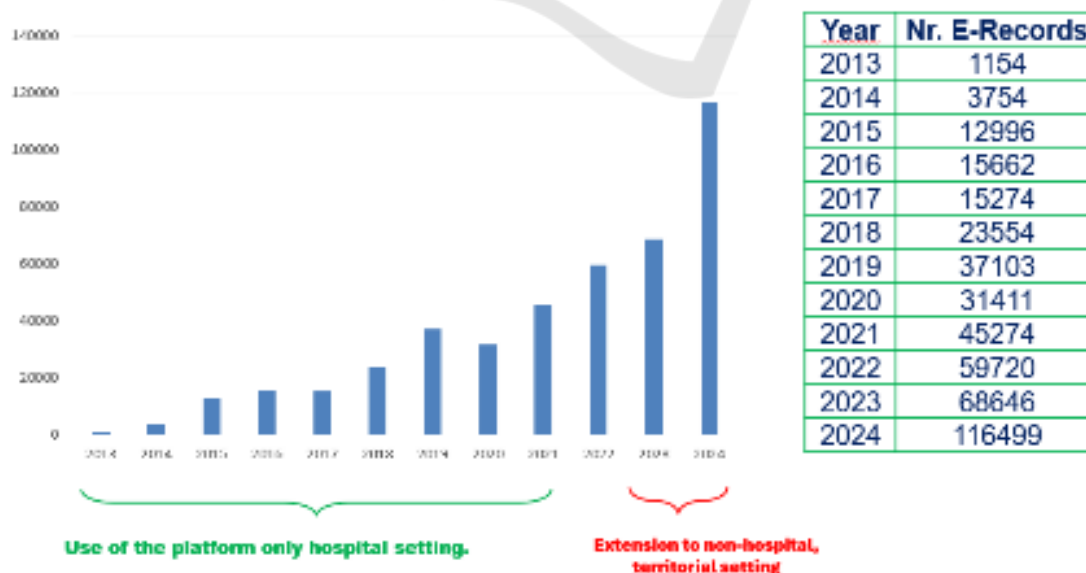


Figure 2: Adoption of the Matilde Platform.

In parallel with the PUAs, the Territorial Operational Center (COT) manages patient setting transfer requests, coming from both hospitals and territorial services.

A transfer record developed on the Matilde platform specifically for the Territorial Operational Centers, already allows for the consolidation of all requests for the activation of protected discharge pathways from the hospital network into a single, computerized channel. This channel, integrated with the hospital record system, facilitates the assessment of the appropriateness of each request, as well as the definition of the patient's needs and the services to be activated.

PUA operators need to monitor and integrate healthcare, socio-healthcare, and social services, involving not only the patient and their family but also General Practitioners and other healthcare and social professionals.

To ensure a seamless and integrated intervention, the decision was made to create a computerized record for the PUAs, using the Matilde platform. This solution enables operators to:

- Collect patient Privacy Authorizations settings, thus limiting the access to the information to the specific professional roles involved in the care path
- Record patient and caregiver contact details, along with information on needs and the socio-healthcare context
- Access health data, including hospital admissions, home care, the use of aids or devices, chronic care pathways, etc.
- Manage and monitor all activations of Health and Social Services coming both from the Hospitals network and the territorial units
- Activate transfer services managed by the COT
- Request healthcare services, such as the provision of medical aids, devices, or activation of care pathways

All the functionalities are within the scope of the Matilde Platform and its integrated digital ecosystem, therefore the implementation is limited to configuring the specific datasets and authorizations to access the information coming from specific integrated systems (e.g. access to the healthcare related admissions) or issuing orders to these systems (e.g. requesting medical aids, activation of social services, activation of transport services).

The resulting Matilde record provides a comprehensive, patient-centered view that enables the detection of needs and vulnerabilities while allowing for the effective management and

assessment of the most appropriate pathways to support the patient's health and social situation.

5 RESULTS AND FUTURE DEVELOPMENTS

The adoption of a comprehensive, configurable, and scalable platform enables a holistic management of patient pathways and access to territorial and social services.

This approach enhances:

- better tracking of activities (many of which were previously recorded on paper)
- reduction of paper consumption
- processes simplification (such as booking and activating services, and accessing the patient's complete health profile)
- reduction of waiting times
- mitigation of risks through a more structured management of data and process

The introduction of Matilde for PUA operators marks just the beginning of a broader effort to involve all healthcare and social professionals within the provincial ecosystem.

The integration of the system with the social network is continuously expanding, now including external organizations that care for vulnerable patients, as well as the Territorial Social Services of the municipalities.

This expansion will lead to the creation of a unified socio-healthcare network across the province, which will include:

- Local Health Authority and the 6 Provincial Hospitals
- Territorial Healthcare Facilities
- 34 Day and Residential Centers for Disabled Individuals
- 90 Residential Centers for Elderly People
- Social Services from 46 Municipalities of the Province

An integrated network will foster better coordination and more efficient care delivery across the region.

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